We claim:

1. A method of manufacturing powder comprising:

providing a metal-containing precursor;

feeding the metal-containing precursor to a reaction zone;

adding a reactive fluid to the metal-containing precursor in the reaction zone thereby creating a stream comprising reacted metal-containing precursor;

conducting high temperature processing of the stream comprising reacted metal-containing precursor at temperatures greater than 2500 ^{o}C to create a vapor;

cooling the vapor to form a vapor stream comprising nucleated nanoscale powders;

quenching the vapor stream comprising nucleated nanoscale powders thereby preventing agglomeration and grain growth;

harvesting the nucleated nanoscale powders.

2. The method of claim 1, wherein the metal-containing precursor is selected from the group comprising an emulsion, fluid, particle-containing liquid slurry, a gas, a solid, a single-phase liquid, a multi-phase liquid, a melt and a fluid mixture.

3. The method of claim 1, wherein the metal-containing precursor is selected from the group comprising metal acetates, metal carboxylates, metal ethanoates, metal alkoxides, metal octoates, metal chelates, metallo-organic compounds, metal halides, metal azides, metal nitrates, metal sulfates, metal hydroxides, metal salts soluble in organics, metal salts soluble in water, and metal-containing emulsions.

4. The method of claim 1, wherein the metal-containing precursor comprises of multiple metals.

5. The method of claim 1, wherein the nanoscale powder comprises a metal.

6. The method of claim 1, wherein the reactive fluid comprises oxygen.

7. The method of claim 1, wherein the reactive fluid comprises carbon.

8. The method of claim 1, wherein the reactive fluid comprises nitrogen.

9. The method of claim 1, wherein the reactive fluid comprises boron.

10. The method of claim 1, wherein the reactive fluid comprises hydrogen.

11. The method of claim 1, wherein the step of feeding the metal-containing precursor to the reaction zone comprises of spraying that enhances heat transfer efficiency, mass transfer efficiency, momentum transfer efficiency, and reaction efficiency.

12. The method of claim 1, wherein the reaction zone is surrounded by a concentric zone to reduce non-uniformities in heat, mass or momentum transfer.

13. The method of claim 1, wherein the step of high temperature processing is achieved using one or more of the means from the group consisting of plasma processes, internal energy, heat of reaction, conduction, convection, radiation, inductive, microwave, electromagnetic, direct electric arc, pulsed electric arc, laser and nuclear.

14. The method of claim 1, wherein the reacted metal-containing precursor is product of combustion.

15. The method of claim 1, wherein the step of high temperature processing is performed at temperatures greater than 3000 ^{o}C.

16. The method of claim 1 further comprising a step wherein carrier particles are added to a later stage of the high temperature processing.

17. The method of claim 1, wherein the harvesting is accomplished using one or more means from the group consisting of bag filtration, electrostatic separation, membrane filtration, cyclones, impact filtration, centrifugation, hydrocyclones, thermophoresis, magnetic separation, impingement filters, screen filters, fabric filters and scrubbers.

18. The method of claim 1, wherein the quenching is accomplished using adiabatic expansion.

19. The method of claim 1, wherein the method includes instrumentation for quality control.

20. The method of claim 1, wherein the process operates near ambient pressure.

21. The method of claim 1, wherein the process operates at a pressure less than 750 mm Hg absolute.

22. The method of claim 21, wherein the pressure is achieved using a compressed fluid-based eductor operating on a venturi principle.

23. A method of producing nanoscale particles in vacuum wherein the vacuum is achieved using a compressed fluid-based eductor operating on a venturi principle.

24. The method of claim 1, wherein the powder manufactured comprises nano-dispersed particles.

25. The method of claim 1, wherein the metal-containing precursor comprises nanoscale powder and coarse carrier particles.

26. The method of claim 1, wherein the powder manufactured comprises carrier particles comprising a ceramic and attached particles comprising a metal.

27. The method of claim 1, wherein the powder manufactured comprises carrier particles comprising a ceramic and attached particles comprising an alloy.

28. The method of claim 1, wherein the powder manufactured comprises carrier particles comprising a ceramic and attached particles comprising an oxide.

29. The method of claim 1, wherein the powder manufactured comprises carrier particles comprising a ceramic and attached particles comprising a ceramic.

30. A powder manufactured using the method of claim 1.